

## 1 ABSTRACT

2 A resonant optical filter including a first and second transmission optical waveguides,  
3 and a resonator, which resonator may include one or more resonator segments evanescently  
4 optically coupled therebetween. The resonator supports a circumferential resonant optical mode  
5 and is evanescently coupled to each of the first and second transmission optical waveguides. In a  
6 preferred embodiment, an optical signal entering the resonant optical filter through the first  
7 transmission optical waveguide and substantially resonant with an optical resonance of the  
8 resonator is substantially transferred to the second transmission optical waveguide and leaves the  
9 resonant optical filter through the second transmission optical waveguide, while an optical signal  
10 entering the resonant optical filter through the first transmission optical waveguide and  
11 substantially non-resonant with an optical resonance of the coupled-optical-resonator system  
12 substantially remains in the first transmission optical waveguide and leaves the resonant optical  
13 filter through the first transmission optical waveguide. Where a resonator includes multiple  
14 resonator segments, the resonator segments of the preferred embodiments are on the same optical  
15 fiber and positioned sufficiently close together to enable optical coupling between them so as to  
16 provide a tailored frequency filter function for optically coupling first and second transmission  
17 optical waveguides. The resonators may be further provided with one or more alignment  
18 structures including flanges and/or grooves for enabling passive positioning and/or supporting  
19 first and second transmission optical waveguides including optical fibers and optical fiber tapers.  
20 Structures may also be provided for suppressing undesired optical modes and/or resonances  
21 associated with the resonators and/or alignment structures on the optical fiber.

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